REMARKS

At the outset, the undersigned attorney thanks the Examiner for her time and assistance in the prosecution of the instant application.

Status of the Claims

Claims 1-4, 9-14, 16, 28-29, 43-50 are currently pending. In the present Submission, claim 16 is cancelled, without prejudice; and claims 1-4, 9-11, 14, 16, 28-29, and 45-49 are amended, without prejudice. Thus, after entry of these amendments, claims 1-4, 9-14, 16, 28-29, 43-50 are presented for reconsideration.

Support for the Claim Amendments

Support for claim amendments to nucleic acid probes and claimed lengths can be found, *inter alia,* at page 20, lines 16-19, of the specification. Support for claim amendments to complementary sequences can be found, *inter alia,* page 3, lines 17-20; and page 69, lines 11-13.

In order to further prosecution, claims 1-4, 9-11, 14, 16, 28-29, and 45-49 were amended to more particularly describe the invention. Applicants reserve the right to prosecute any of the claims, as it stood, before the amendments made in the present Submission, in a future application.

Applicants respectfully submit that the claims as currently pending meet all the requirements for patentability, such as written description and enablement. For example, one of the defined functions of the nucleic acids of the invention is that they can be used as probes or primer pairs for identifying polynucleotides that are indicative of GCA (see, *e.g.*, pages 20 and 21 of the specification). It would have been well within the knowledge of one skilled in the art, at the time of filing, to design probes and primers based upon the written disclosure of the sequences provided in the specification (the structure). For example, the specification lists references that exemplify the level of knowledge of the art, such as on page 20, the Tijssen reference teaching the principles of hybridization, and on pages 21-23, discussing amplification

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methodologies and designing degenerate primers. Accordingly, one skilled in the art would have the skill and resources to isolate nucleic acids that would hybridize to the nucleic acid sequence of SEQ ID NO:3.

The specification also provides an exemplary function of the nucleic acids, *i.e.*, that they can be used to identify polynucleotides that are indicative of GCA (see, *e.g.*, page 68, line 23, to page 70, line 10 of the specification). It is also well known in the art that probes and primers can be used to specifically identify or detect polynucleotides. For example, such probes and primer pairs are used routinely to screen libraries for desired polynucleotides as well as for diagnosing disease.

One skilled in the art would recognize that the structure of the claimed nucleic acid (its sequence) can determine its function (ability to hybridize to/amplify SEQ ID NO:3, or a portion thereof). The specification provides the skilled artisan with a template sequence (SEQ ID NO:3) from which, probes and primers can be designed. The skilled artisan would recognize that the relationship between structure and function is that the structure of a polynucleotide (*i.e.*, contents of its sequence) affects its function (*i.e.*, ability to hybridize to a particular polynucleotide).

Thus, Applicants respectfully submit that the application provides the structure of the claimed invention by disclosing the sequence of SEQ ID NO:3 and guidance for one of skill in the art to use the sequence of SEQ ID NO:3 to design probes and primers for diagnostic purposes. Therefore, the specification describes the claimed nucleic acids in terms of structure and function and provides an adequate description of the claimed invention.

It should also be mentioned that, at the time the instant application was filed, the state of the art and level of skill of the artisan in the field of molecular biology was very advanced. Thus, armed with the disclosure provided in the application, one of ordinary skill in the art can use well-known laboratory techniques to create the claimed nucleic acids to be used as probes or primer pairs. The specification provides additional resources to provide further guidance on probes, hybridization conditions, primers, and amplification procedures. Accordingly, based on

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Applicants' disclosure, the claimed invention is properly enabled for one skilled in the art to practice the full scope of the claimed invention.

Applicants respectfully aver that it would be a matter of routine experimentation, not undue experimentation, for one skilled in the art to design the appropriate probes/primers and conditions. Regarding undue experimentation, the Federal Circuit in *In re Wands* directed that the focus of the enablement inquiry should be whether the experimentation needed to practice the invention is or is not "undue" experimentation. The court set forth specific factors to be considered.

One of these factors is "the quantity of experimentation necessary." Guidance as to how much experimentation may be needed and still not be "undue" is set forth by the Federal Circuit in, *e.g.*, *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*[1] An applicant had claims that were generic to all IgM antibodies directed to a specific antigen. However, only a single antibody producing cell line had been deposited.[2] The PTO had rejected claims that were generic to all antibodies directed to the antigen as lacking an enabling disclosure.

The Federal Circuit reversed, noting that the evidence indicated that those skilled in the monoclonal antibody art could, using the state of the art and applicants' written disclosure, produce and screen new hybridomas secreting other monoclonal antibodies falling within the genus without undue experimentation. The court held that applicants' claims need not be limited to the specific, single antibody secreted by the deposited hybridoma cell line (significantly, the genus of antibodies was allowed even though only one antibody species was disclosed). The court was acknowledging that, because practitioners in that art are prepared to screen large numbers of negatives in order to find a sample that has the desired properties, the screening that would be necessary to make additional antibody species was not "undue experimentation."

Analogously, practitioners of molecular biology for the instant invention also recognize that many constructs may need to be created/isolated and analyzed to isolate the claimed

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1 *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987).

2 The cell line was a hybridoma, thus, all of the antibodies it produced had the same structure and activity.

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polynucleotides. However, the procedures for isolating the claimed nucleic acids and utilizing sequences such as for the construction of probes are widely accepted, routine protocols, not requiring "undue experimentation" to be practiced. Accordingly, one skilled in the art has sufficient guidance by the specification to practice the claimed methods without undue experimentation.

In light of the amendments and remarks set forth above, Applicants respectfully submit that the claims are in condition for allowance. If, in the Examiner's opinion, a telephonic interview would expedite the favorable prosecution of the present application, the undersigned attorney would welcome the opportunity to discuss any outstanding issues and to work with the Examiner toward placing the application in condition for allowance.

Attached is a marked-up version of the changes being made by the current amendment.

Applicants believe that no fees are necessitated by the present Response. However, in the event any fees are due, the Commissioner is hereby authorized to charge any such fees to Deposit Account No. 06-1050.

Respectfully submitted,

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Version with markings to show changes made

In the claims:

Claim 44 has been cancelled.

Claims 1-4, 9-11, 14, 16, 28-29, and 45-49 have been amended as follows:

1. (Thrice Amended) An isolated or recombinant nucleic acid comprising[:] a nucleic acid sequence [having at least 75% sequence identity to] consisting essentially of SEQ ID NO:3, or its complement, wherein the nucleic acid is capable of identifying or detecting a Giant Cell Arteritis (GCA) [GCA] associated nucleic acid.

2. (Twice Amended) The nucleic acid of claim 1, wherein the nucleic acid sequence is 10 to 50 nucleotides [the sequence identity to SEQ ID NO:3 is at least 85%].

3. (Thrice Amended) The nucleic acid of claim 1 [2], wherein the nucleic acid sequence is at least 50 nucleotides [identity to SEQ ID NO:3 is at least 95%].

4. (Thrice Amended) An isolated or recombinant nucleic acid comprising a sequence as set forth in SEQ ID NO:3, or its complement.

9. (Twice Amended) [An isolated or recombinant nucleic acid] A nucleic acid probe comprising a nucleotide sequence consisting essentially of a sequence which specifically hybridizes to a nucleic acid comprising a sequence as set forth in SEQ ID NO:3 under stringent conditions, wherein the stringent conditions include a wash step comprising a wash in 0.2X SSC at a temperature of about 65°C for about 15 minutes.

10. (Thrice Amended) The nucleic acid of claim 1, claim 4, claim 9, [claim 44] or claim 45, wherein the nucleic acid sequence is between about 15 and about 200 residues in

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length; is between about 25 and about 100 residues in length; or is between about 35 and about 75 residues in length.

11. (Thrice Amended) An expression vector comprising at least one nucleic acid operably linked to a promoter, wherein the nucleic acid comprises a sequence as set forth in claim 1, claim 4, claim 9, [claim 44] or claim 45.

14. (Thrice Amended) A transformed cell comprising the nucleic acid of claim 1, claim 4, claim 9, [claim 44] or claim 45.

16. (Thrice Amended) A polymerase chain reaction (PCR) primer pair that can amplify a nucleic acid sequence as set forth in claim 1, claim 4, claim 9, [claim 44] or claim 45, or a subsequence thereof, under in situ or in vitro conditions.

28. (Thrice Amended) A kit for detecting the presence of nucleic acid sequences associated with GCA in a sample comprising a nucleic acid as set forth in claim 1, claim 4, claim 9, claim 16 [claim 44] or claim 45, wherein the nucleic acid of the sample detectably hybridizes to a nucleic acid as set forth in claim 1, claim 4, claim 9, claim 16 [claim 44] or claim 45 under in situ or in vitro conditions.

29. (Thrice Amended) A kit for detecting the presence of nucleic acid sequences associated with GCA in a sample comprising an amplification primer pair that can amplify a nucleic acid in the sample having a sequence as set forth in claim 1, claim 4, claim 9, claim 16 [claim 44] or claim 45 under in situ or in vitro conditions.

45. (Amended) An isolated or recombinant nucleic acid consisting essentially of [comprising] a nucleic acid sequence encoding a polypeptide as set forth in SEQ ID NO:4, or its complement.

46. (Amended) A method for diagnosing [or determining predisposition for] GCA comprising the following steps:

(a) providing a nucleic acid as set forth in claim 1, claim 4, claim 9, [claim 44,] or claim 45, wherein the nucleic acid is capable of detectably hybridizing to a GCA associated nucleic acid under in situ or in vitro conditions;

(b) providing a tissue [or serum or urine] sample;

(c) contacting the nucleic acid with the sample; and

(d) detecting whether the nucleic acid hybridizes to a nucleic acid in the sample, wherein the specific hybridization is diagnostic for [or determines a predisposition for] GCA.

47. (Amended) A method for diagnosing [or determining predisposition for] GCA comprising the following steps:

(a) providing a nucleic acid amplification primer pair as set forth in claim 16, wherein the primer pair can amplify a GCA-associated nucleic acid under in situ or in vitro conditions;

(b) providing a tissue [or serum or urine] sample;

(c) contacting the primer pair with the sample under amplification reaction conditions; and

(d) detecting whether the primer pair has amplified a nucleic acid in the sample, wherein amplification is diagnostic for [or determines a predisposition for] GCA.

48. (Amended) A method for detecting the presence of a nucleic acid [comprising a] sequence as set forth in SEQ ID NO:3 to diagnose [or determine the predisposition for] GCA comprising the following steps:

(a) providing a nucleic acid as set forth in claim 1, claim 4, claim 9, [claim 44,] or claim 45, wherein the nucleic acid is capable of hybridizing to a GCA associated nucleic acid under in situ or in vitro conditions;

(b) providing a biological sample comprising a nucleic acid;

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(c) contacting the nucleic acid with the biological sample under conditions wherein the nucleic acid is capable of hybridizing to a nucleic acid comprising a sequence as set forth in SEQ ID NO:3 under in situ or in vitro conditions; and

(d) detecting whether the nucleic acid specifically hybridizes to a nucleic acid in the sample, wherein the specific hybridization is diagnostic for [or determines a predisposition for] GCA.

49. (Amended) A method for detecting the presence of a nucleic acid [comprising a] sequence as set forth in SEQ ID NO:3 to diagnose [or determine the predisposition for] GCA comprising the following steps:

(a) providing an amplification primer pair capable of detecting a nucleic acid comprising a sequence as set forth in SEQ ID NO:3 by amplification;

(b) providing a biological sample comprising a nucleic acid;

(c) contacting the amplification primer pair of step (a) with the biological sample under conditions wherein the amplification primer pair is capable of amplifying the nucleic acid; and

(d) detecting the presence of an amplification product, wherein the presence of an amplification product is diagnostic for [or determines a predisposition for] GCA.

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